Date: July 13, 2018

To: Ronny J. Coleman, Chairman
Statewide Training and Education Advisory Committee
c/o State Fire Training

From: Joe Bunn, Fire Service Training Specialist III

Subject/Agenda Action Item: FSTEP Aircraft Rescue and Firefighting (ARFF) Awareness Curriculum (2018)

Recommended Actions: Information/Discussion

Background Information:
This curriculum is being presented for the first time to STEAC. During this presentation, we are looking for feedback on the curriculum.

The concept of developing new FSTEP course curriculum is with the purpose of continuing education and professional development, which was approved by STEAC on April 18, 2014. Accordingly, stakeholders identified the need for the creation of numerous courses. In June of 2016 the need was identified for an awareness course for fire department personnel responding outside the Airport environment to be able to function and support operations of incidents that occur at an Airport. The Aircraft Rescue and Firefighting Awareness course is one of many that SFT hopes to complete and provide the California Fire Service.

Therefore, a cadre of experienced subject matter experts with extensive technical expertise in the area of Aircraft Rescue and Firefighting Operations were selected from various agencies and backgrounds with the mission to create the content for this new FSTEP course. The development of the Course Plans did not require the development of a Certification Training Standards (CTS) because this course is established as a FSTEP course. Terminal Learning Objectives can be developed from JPR’s from NFPA standard when available. In this particular case there is only one chapter (14) in NFPA 402, Guide for Aircraft Rescue and Fire-Fighting Operations, 2013 edition that has no JPR’s, but guideline/suggestions in different specific areas related to structural fire department operations at ARFF (Aircraft Rescue and Firefighting Operations) incidents. However, the authority that drives these types of incidents is the Code of Federal Regulations, Title 14, Part 139, Subpart D, Section 139.319, which deals with the requirements for Aircraft Rescue and Firefighting Operations. The Cadre from the specific reference materials utilized for the course work developed the Terminal Learning Objectives. The development of the material required one multi-day session. Several of the cadre members are State Fire Instructors and facilitate classes through the Community College system and have extremely strong backgrounds in aircraft rescue and firefighting and the incidents involved at large international airports to small multiple airports you find all over the State of California.
The designated cadre of experienced subject matter experts with extensive ARFF experience were selected from various agencies and backgrounds in the mission to create a new awareness course for the Non-ARFF community of the California Fire Service. All their good work translated into this new FSTEP course.

**Cadre Leadership**

Joe Bunn, Fire Service Training Specialist III, Deputy Chief (ret) US&R CA-TF8, Allison Shaw, Cadre Editor, Sacramento State.

**Development Cadre Members**

Robert Bonin, Fire Captain, NASA Ames Fire Department, Dale Carnes, Fire Chief, Sacramento Airport Fire, Kevin Corbett, Fire Engineer, Santa Barbara City Fire Department, David Cruz, Fire Captain, Monterey Fire Department, Robert Edie, Training Officer, San Bernardino County Fire Department, Richard Fields, Battalion Chief, Los Angeles Fire Department, James Kubczak, Firefighter, Hollywood-Burbank Airport, Eric Lieuwen, Fire Captain, Sacramento Airport Fire, Scott Quinn, Battalion Chief, Los Angeles Fire Department, Brett Walker, Fire Captain, California Department of Forestry and Fire Protection

The breakdown of the 8-hour FSTEP course is as follows:

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<th>Aircraft Rescue and Firefighting Awareness</th>
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**Analysis/Summary of Issue:**

Following is an analysis of the new FSTEP course being developed.

1. This new course provides an awareness level training of the requisite knowledge, skills, and abilities for those that have responsibility respond offsite to an Aircraft Rescue and Firefighting Operation taking place at an airport facility of any kind. Typically, this would be an incident where the ARFF resources would need support for operations to mitigate an incident. This course gives the Non-ARFF responding unit or units the ability to enter the ARFF environment and operation within the confines of an airport and be effective and safe.

2. The core of the content utilizes the Code of Federal Regulations, Title 14, Part 139, Subpart D, Section 139.319, Aircraft Rescue and Firefighting Operational Requirements. In addition, the NFPA 402, Guide for Aircraft Rescue and Firefighting Operations, 2013 edition. The only section within this standard that deals with Non-ARFF or Structural Fire Department Operations at ARFF incidents (chapter 14) are suggestions/guidelines without providing any specific JPR’s to develop TLO’s or ELO’s generally used, if possible for the development of and CFSTES or FSTEP course. The TLO’s and supporting ELO’s were developed with the operational guidelines provided by the CFR and in detail from section 139.319. This course meets the awareness level only. I would highly recommend this course for any fire department that is full time or volunteer who may have the responsibility to respond to an onsite airport incident and work within the ARFF environment.

3. Following the Homeland Security Presidential Directive-5 definition and requirements for ICS training and would greatly benefit from such training to insure the safety of all personnel on this type of incident.
Aircraft Rescue and Fire Fighting Awareness

Course Plan

Course Details

Description: This course provides an awareness-level overview of aircraft rescue and fire fighting.

Designed For: Non-ARFF trained fire fighters who support aircraft rescue and fire fighting operations

Authority: Code of Federal Regulations, Title 14, Part 139, Subpart D, Section 139.319, Aircraft Rescue and Firefighting Operational Requirements

Prerequisites: None

Corequisites: None

Standard: Attend all class sessions and complete all activities and assignments

Hours:

Lecture: 6:30

Hours (Total): 6:30

Maximum Class Size: 30

Instructor Level: Primary Instructor

Instructor/Student Ratio: 1 to 30

Restrictions: None

SFT Designation: FSTEP
Required Resources

Instructor Resources
To teach this course, instructors need:

Additional resources:
    o Chapter 14 Structural Fire Department Operations at ARFF Incidents

Online Instructor Resources
The following instructor resources are available online at [http://osfm.fire.ca.gov/training/instructorresources.php](http://osfm.fire.ca.gov/training/instructorresources.php):
  • Ground Vehicle Guide to Airport Signs & Markings
    (available at [www.faa.gov/go/runwaysafety](http://www.faa.gov/go/runwaysafety))

Student Resources
There are no required student resources for this course.
For further study, students may wish to review:

Facilities, Equipment, and Personnel
The following facilities, equipment, or personnel are required to deliver this course:

Facilities
  • Standard classroom equipped for 30 students
  • Whiteboards or easel pads with appropriate writing implements
  • Projector with appropriate laptop connections
  • Wifi/Internet access (recommended)
Unit 1: Introduction

Topic 1-1: Orientation and Administration

Terminal Learning Objective
At the end of this topic, a student will be able to identify facility and classroom requirements and identify course objectives, events, requirements, assignments, activities, resources, evaluation methods, and participation requirements in the course syllabus.

Enabling Learning Objectives
1. Identify facility requirements
   - Restroom locations
   - Food locations
   - Smoking locations
   - Emergency procedures
2. Identify classroom requirements
   - Start and end times
   - Breaks
   - Electronic device policies
   - Special needs and accommodations
   - Other requirements as applicable
3. Review course syllabus
   - Course objectives
   - Calendar of events
   - Course requirements
   - Student evaluation process
   - Assignments
   - Activities
   - Required student resources
   - Class participation requirements

Discussion Questions
1. Determined by instructor

Activities
1. Determined by instructor

Instructor Notes
1. None

Topic 1-2: Goals and Objectives

Terminal Learning Objective
At the end of this topic, a student, given goals and objectives, will be able to identify the goals and objectives of aircraft rescue and fire fighting (ARFF) awareness for structural (non-ARFF/N-ARFF) fire fighters.
Enabling Learning Objectives

1. Identify the goals of ARFF awareness training for N-ARFF fire fighters
   - Understand N-ARFF impact on incident outcomes
   - Safely operate during an aircraft incident
   - Provide support for aircraft incidents
   - Reduce actions that may impede or create adverse impacts for ARFF operations during an aircraft incident

2. Identify the objectives of this Aircraft Rescue and Fire Fighting course
   - Identify airport facilities and visual indicators critical to aircraft incidents
   - Identify aircraft types, components, and hazards
   - Identify command and primary response entities
   - Identify communication methods
   - Identify ARFF apparatus components, features, and hazards
   - Identify extinguishing agents commonly used during aircraft incidents
   - Identify how to support ARFF crews during aircraft incidents

3. Identify the importance of effective and timely ARFF operations
   - Life safety
     - Passengers
     - Crew
     - Fire service personnel
   - Property conservation
     - Airport structures
     - Aircraft
     - Surrounding property
   - Societal restoration (return airport to normal operating state as quickly as possible)
     - Flight groundings or delays create
       - National and/or international ripple effect in air travel
       - Impacts to other transportation systems
       - Financial loss for the airport
       - Financial loss for impacted industries and organizations
     - Aircraft incidents impact airport reputation

Discussion Questions

1. What impact do N-ARFF have on an aircraft incident?
2. What “ripple effects” can be triggered by an aircraft incident?
3. What experience do you have with aircraft incidents?

Activities

1. Determined by instructor

Instructor Notes

1. None

Unit 2: Airport and Aircraft Familiarization
Topic 2-1: Airport Familiarization

Terminal Learning Objective
At the end of this topic, a student, given an overview of airport components, will be able to identify airport facilities and visual indicators critical to aircraft incidents.

Enabling Learning Objectives
1. Identify types and classifications of airports
   - Controlled vs. non-controlled
   - Index vs. non-index
2. Identify common airport facilities and components
   - Terminals
   - Baggage areas
   - Hangars
   - Fuel storage and distribution
   - Fixed Base Operators (FBO)
   - Access points
   - Engineered Material Arresting System (EMAS)
   - Instrument Landing System (ILS)
   - ARFF fire station
   - Underground/subsurface hydrants
3. Identify runways and taxiways
   - Locations
   - Purpose
4. Identify airport ground lighting systems
   - Blue lights
   - White lights
   - Green lights
   - Yellow/amber lights
   - Red lights
5. Identify airport ground marking and signage systems critical to safe travel on the airport operations area (AOA)
   - Location (to identify where you are)
   - Direction (to get to where you need to be)
   - Hold Position (to know where you can and cannot drive)

Discussion Questions
1. What types of airport classifications are present in your jurisdiction?
2. How is an understanding of ground markings critical to incident success?
3. What makes an airport environment different from other potential incident environments?

Activities
1. Determined by instructor
Instructor Notes

2. Corresponds to 14 CFR 139.319 (i)(2)(i) and (iii).

Topic 2-2: Aircraft Familiarization

Terminal Learning Objective

At the end of this topic, a student, given an overview of aircraft, will be able to identify aircraft types, components, and hazards commonly involved in aircraft incidents.

Enabling Learning Objectives

1. Identify common aircraft types
   - General aviation
   - Commercial
   - Cargo
   - Military
   - Rotor wing
2. Identify basic aircraft components
   - Fuselage
   - Wings
   - Nose
   - Tail
   - Landing gear
   - Doors
   - Engines
3. Identify hazards associated with aircraft
   - General aviation, commercial aircraft
     - Intake and exhaust hazards
     - Rotors
     - Radar system
     - Hot brakes/wheels
     - Exotic metals
     - Composite materials
     - Escape slides
     - Seatbelt airbags
     - Batteries
     - Ballistic recovery systems
     - Cargo
     - Hydraulic hazards
   - Military aircraft
     - Munitions
     - Ordinance
     - Ejection seat/canopy
Unit 3: Command and Communications

Topic 3-1: Command and Primary Response Entities

Terminal Learning Objective
At the end of this topic, a student, given agency lists and N-ARFF roles, will be able to identify the agencies and organizations involved in aircraft incident and the N-ARFF firefighter’s role within the unified command structure.

Enabling Learning Objectives
1. Identify the agencies that make up aircraft incident unified command
   • Fire service
   • Law enforcement
   • Emergency medical services
   • Airport operations
2. Identify additional agencies that may be part of aircraft incident operations
   • Airline company
   • Aircraft manufacturer
   • Government entities
     o NTSB (National Transportation Safety Board)
3. Identify the N-AFFF fire fighter’s role in an aircraft incident
   • Carry out a tactical assignment within a branch, group, division, or unit
   • Assist with the incident
   • Do not impede or create adverse impacts for ARFF operations

Discussion Questions
1. Who might be involved in incident command for an aircraft incident in your jurisdiction?
2. What is the N-AFFF fire fighters role in an aircraft incident?

Activities
1. Determined by instructor

Instructor Notes
1. Corresponds to 14 CFR 139.319 (i)(2)(xi).

Topic 3-2: Communications

Terminal Learning Objective
At the end of this topic, a student, given notification methods, alerts, and frequency types, will be able to identify communication methods utilized during aircraft incident.

Enabling Learning Objectives
1. Identify notification methods
   • “Crash” phone (direct line from air traffic control tower)
   • Radio system
   • Pager
2. Identify types of aircraft alerts
   • Alert I (Local Standby Alert)
     o In-flight emergency that if left unchecked will not negatively impact the aircraft, crew, and passengers
   • Alert II (Full Emergency Alert)
     o In-flight emergency that if left unchecked may negatively impact the aircraft, crew, and passengers
   • Alert III (Aircraft Accident Alert)
     o Actual crash on or around the airport
     o N-AFFF personnel likely to be assigned tasks
3. Identify information communicated during initial notification
   • Type of alert
   • Aircraft make and model
   • Air carrier and flight or tail number
   • Emergency situation
   • Number of personnel on board
   • Amount of fuel on board
Other known relevant information

4. Identify frequencies commonly used during an aircraft incident
   • Command channel (dispatch)
   • Tactical channel (other units assigned to incident)
   • Tower channel (in-flight aircraft communicating with tower)
   • Ground channel (ground aircraft communicating with tower)
   • Discreet emergency frequency (DEF) (communicate with pilot)

Discussion Questions
1. How is your agency notified of an aircraft emergency?
2. What do the three types of airport alerts mean for a N-ARFF?
3. What type of information is typically provided during an initial notification?

Activities
1. Determined by instructor

Instructor Notes
1. Corresponds to 14 CFR 139.319 (i)(2)(iv).

Unit 4: ARFF Apparatus and Extinguishing Agents

Topic 4-1: ARFF Apparatus

Terminal Learning Objective
At the end of this topic, a student, given an ARFF apparatus overview, will be able to identify components, features, and hazards unique to ARFF apparatus in order to work collaboratively with all available resources during aircraft incidents.

Enabling Learning Objectives
1. Identify equipment and components unique to ARFF apparatus
   • Turrets/HRET (high reach extendable turret)
   • Hand lines
   • Ground sweep nozzles
   • Undertruck nozzles
   • Medical supplies
   • Ladders
   • Rescue tools and equipment
2. Identify vehicle features unique to ARFF apparatus
   • Operate effectively on both paved and unpaved areas
   • Carry large quantities of extinguishing agents on board
   • May have two types of intakes
     o Water fill (direct intake to tank)
     o Water suction (direct intake to pump)
   • Designed for one-person operation
3. Identify potential hazards unique to ARFF apparatus
   • Operator
o Usually only one
o Limited visibility
o Multitasking on multiple systems

- Apparatus
  - Moves quickly and often throughout an incident
  - Poor turning radius and high center of gravity
  - High volume turret streams

4. Identify other support vehicles and equipment unique to aircraft incidents
   - Stair truck (interior access vehicle)
   - Foam supply vehicles and trailers
   - Mass casualty vehicles and trailers
   - Airport operations vehicles

5. Identify structural apparatus tools and equipment that can be used on an aircraft incident
   - Extrication tools
   - Forcible entry tools
   - Ground ladders
   - Thermal imagers
   - Other tools as appropriate

Discussion Questions
1. How do ARFF apparatus differ from structural fire fighting apparatus?
2. What safety concerns are associated with ARFF apparatus?
3. What tools and equipment from a structural apparatus might be used during an aircraft incident?

Activities
1. Determined by instructor

Instructor Notes
1. Corresponds to 14 CFR 139.319 (i)(2)(iii), (v), and (ix).

Topic 4-2: Extinguishing Agents

Terminal Learning Objective
At the end of this topic, a student, given an overview of extinguishing agents, will be able to identify extinguishing agents commonly used during aircraft incidents in order to take appropriate safety precautions.

Enabling Learning Objectives
1. Identify extinguishing agents used in ARFF operations
   - Water
   - Foam agents
   - Dry chemicals
   - Halogenated agents and halon replacements
   - Dry powders
   - CO₂
• Often used in combination

2. Identify safety precautions associated with ARFF extinguishing agents
   • Always maintain situational awareness
   • Always protect against skin absorption and inhalation
   • Aqueous Film Forming Foam (AFFF) has high concentration of fluorine and requires gross decontamination after exposure
   • Maintain foam blanket integrity
     o Breaking surface tension can reignite fire
     o Avoid kneeling, stomping, straight streams, dropping equipment
     o Foam blankets may obscure hazards and debris

Discussion Questions
1. What are the most common extinguishing agents used during aircraft incidents?
2. What extinguishing agents does your jurisdiction use for aircraft incidents?
3. What precautions do you need to take when working in and around foam blankets?

Activities
1. Determined by instructor

Instructor Notes
1. Corresponds to 14 CFR 139.319 (i)(2)(iii) and (vi).

Unit 5: Aircraft Rescue and Fire Fighting Operations

Topic 5-1: Aircraft Rescue and Fire Fighting Operations

Terminal Learning Objective
At the end of this topic, a student, given sample operational goals and objectives, will be able to identify how to support ARFF crews during aircraft incident.

Enabling Learning Objectives
1. Identify the types of incidents associated with aircraft at an airport
   • In-flight vs. ground emergencies
   • Low-impact vs. high-impact crashes
2. Identify the correct way to access an airport operation area
   • Use approved gates or access points
   • Carry proper credentialing
   • Wait for an escort unless otherwise instructed
   • Report to staging area for instruction
3. Identify the best way to approach an aircraft incident
   • Aircraft always have the right of way
     o Watch for signs of landing aircraft or ground aircraft preparing to move
   • Follow an escort if provided
   • Follow all signage and markings
   • Avoid runway and taxiway incursion
   • Keep emergency lights on
• Approach uphill and upwind when possible
• Be aware of repositioning ARFF apparatus
• Be aware of foreign object debris (FOD)
  o Bodies
  o Aircraft parts
  o Hazardous materials

4. Identify the proper way to position an apparatus at an aircraft incident
• Position in accordance with assignment
• Utilize aircraft orientation terminology
  o Forward and aft
  o All directions orient from pilot seat perspective
  o Clock method using nose as 12 and tail as 6
  o Engine numbering runs left to right
  o Door numbering runs nose to tail, identifying left and right

5. Identify factors to consider when working with ARFF crews
• Maintain constant awareness of ARFF apparatus positions and movement
• Make eye contact with operator before approaching an ARFF vehicle
• ARFF apparatus hose lines operate at a higher pressure
• Follow direction of Incident Command (IC) or ARFF personnel

6. Identify the main roles of a N-ARFF at an aircraft incident
• Goal of fire suppression is to create a fire-free evacuation and rescue path
• Fire suppression
  o Interior fire suppression carried out in support of search and rescue, not to save the aircraft
  o Hand lines
  o Water supply
  o Spot fires
• Evacuation
  o Unassisted passenger evacuation
  o Agency-supported evacuation
    ▪ Stabilize emergency slide
    ▪ Direct passengers to holding location
• Search and rescue
  o Check all cabins, compartments, and spaces
  o Check surrounding areas
• Extrication
• Patient management/multi-casualty incident (MCI)
  o Triage
  o Treatment
  o Transport

7. Identify other considerations associated with an aircraft incident
• Scene preservation
• Flight data recorder and cockpit voice recorder (“black box”)
  o It’s orange, not black
  o Avoid moving it
  o Protect it
  o Notify incident command (IC)
• Overhaul
• Extended operational periods
  o Investigation
  o Aircraft removal
• Media presence
• Professional conduct
• Critical incident stress debriefing (CISD)
• After action report (AAR)

Discussion Questions
1. How could different factors impact incident approach?
   • Time of day
   • Weather
   • Terrain
2. What type of aircraft ground emergencies might you encounter in your jurisdiction?
3. Who has the right of way during an aircraft incident?
4. What type of activities do structural fire fighters carry out during an aircraft incident?
5. What type of debris might you encounter during an aircraft incident?

Activities
1. Determined by instructor

Instructor Notes
1. Corresponds to 14 CFR 139.319 (i)(2)(iii), (vii), and (viii).
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The Course Totals time reflects actual teaching/lecture time. With an additional one-hour meal period and 30 minutes allotted for breaks, the total scheduled time for this course is 8 hours.

**Acknowledgments**

State Fire Training gratefully acknowledges the following individuals and organizations for their diligent efforts and contributions that made the development and publication of this document possible.

**Cadre Leadership**

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**Partners**

State Fire Training also extends special acknowledgement and appreciation to the Conference and Training Services Unit with the College of Continuing Education at California State University, Sacramento, for its ongoing meeting logistics and curriculum development support, innovative ideas, and forward-thinking services. This collaboration is made possible through an interagency agreement between CAL FIRE and Sacramento State.
Aircraft Rescue and Firefighting Awareness
Implementation of New Curriculum

This document is intended to provide information for all State Fire Training (SFT) stakeholders on the new Aircraft Rescue and Firefighting Awareness Curriculum (2018). Stakeholders are encouraged to study this information carefully and seek clarification from SFT if questions arise. NOTE: Special attention should be paid to this new updated FSTEP course, as it is NOT included in any of SFT certification tracks at this time.

Aircraft Rescue and Firefighting Awareness (2018) curriculum is a new course. The new Course Plan has been developed based on current the Code of Federal Regulations, Title 14, Part 139, Subpart D, Section 139.319, the deals with the requirements for Aircraft Rescue and Firefighting Operations. Usually the NFPA standards are used develop the course TLO’s and supporting ELO’s, however in this particular case there is only one chapter (14) in NFPA 402, Guide for Aircraft Rescue and Fire-Fighting Operations, 2013 edition that contains no JPR’s, but guideline/suggestions in different specific areas related to structural fire department operations at ARFF (Aircraft Rescue and Firefighting Operations) incidents. The Course Plan will be available on the SFT website.

Aircraft Rescue and Firefighting Awareness (2018) Change Timeline

FULL IMPLEMENTATION......................................................... Effective January 1, 2019
INSTRUCTOR REQUIREMENTS .......................................................... Effective January 1, 2019

New instructors for Aircraft Rescue and Firefighting Awareness (2018) course shall meet the SFT requirements for Registered Instructor, and will be required to either take the course or apply for a Pace II review of their instructor qualifications, including appropriate education and practical experience relating to course content.

Additionally, a new instructor of the Aircraft Rescue and Firefighting Awareness (2018), a FSTEP course, the following shall apply:

1. Rank and Professional Experience:
   a. Held the rank of suppression firefighter within a Recognized Fire Agency in California for a minimum of three years or;
   b. Worked as a volunteer suppression firefighter or paid call officer with a Recognized Fire Agency in California for a minimum of five years.
   c. Have a minimum of three years’ experience within a recognized fire agency in California in the field of aircraft rescue and fire fighting

SFT STAFF COORDINATION

This FSTEP course Aircraft Rescue and Firefighting Awareness (2018) is new.

POTENTIAL AGENCY IMPACTS

Fire agencies will have the typical impacts of new training with a new curriculum for training and operational implementation.

NOTE: Special attention should be paid to this new updated FSTEP course, as it is NOT included in any of SFT certification tracks at this time.

Accredited Regional Training Programs (ARTP), Accredited Local Academies (ALA), community colleges and all other local delivery venues need to review the curriculum and seek approval from their curriculum committee/program sponsor, as appropriate.